Highlights of Spanish Astrophysics XI, Proceedings of the XV Scientific Meeting of the Spanish Astronomical Society held on September 4–9, 2022, in La Laguna, Spain. M. Manteiga, L. Bellot, P. Benavidez, A. de Lorenzo-Cáceres, M. A. Fuente, M. J. Martínez, M. Vázquez- Acosta, C. Dafonte (eds.), 2023

Chemical evolution of local galaxies.

Artemi Camps-Fariña[1,2], Patricia Sánchez Blázquez[1], and Sebastián F. Sánchez[2]

[1] Departamento de Física de la Tierra y Astrofísica, Facultad de Ciencias Físicas, Universidad Complutense de Madrid, 28040, Madrid
[2]Instituto de Astronomía, Universidad Nacional Autónoma de México, CP 04510, Mexico City, Mexico

Abstract

We show the results of a study using the spectral synthesis technique study to measure the chemical evolution of local galaxies. The main parameters measured are the chemical enrichment history (ChEH) and the evolution of the stellar mass-metallicity relation (MZR) over cosmic time. We find that the more massive galaxies became enriched first and the lower-mass galaxies did so later, producing a change in the MZR that becomes shallower in time. The mass dependence of the MZR becomes less relevant for later morphological types, to the extent that it inverts for Sd/Irr galaxies, suggesting that morphology is at least as important a factor as mass in the chemical evolution. We also find that the average metallicity gradient is currently negative for all mass bins but for low-mass galaxies it used to be positive before switching to the current negative average value. Some galaxies show decreases in their ChEHs, which we find correlate with the presence of an AGN and the sSFR. Finally, by comparing the expected yields of the star-forming histories to the measured ChEHs using a chemical evolution model we can estimate the history of pristine gas accretion over the lifetime of the galaxies. The inflow histories show that for a galaxy to still be forming stars in the present time it requires a steady flow of pristine gas which dilutes its chemical content, meaning the primary parameter that shapes the star-forming main sequence is access to gas accretion.

My poster is available at https://zenodo.org/record/7017730